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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/822,926	03/30/2001	Hisashi Tsujimoto	09792909-4817	8279

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EXAMINER

CREPEAU, JONATHAN

ART UNIT PAPER NUMBER

1746

DATE MAILED: 09/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/822,926

Applicant(s)

TSUJIMOTO ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 7-29 is/are pending in the application.
- 4a) Of the above claim(s) 17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,7-16 and 18-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 4, 2003 has been entered.

This Office action addresses claims 1, 2, 7-17, and newly added claims 18-29. Claim 17 remains withdrawn as being drawn to a nonelected invention. Claims 1, 2, 7-16, and 18-29 are newly rejected under 35 USC §103 and 35 USC §112, first paragraph, as necessitated by amendment. This action is non-final.

Claim Objections

2. Claim 19 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 18. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

3. Claim 1 is objected to because of the following informalities: the ranges " $0.9 \leq x \leq 2.0$ " and " $0.01 \leq y \leq 0.50$ " in line 12 contain typographical errors. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 2, 7-16, and 18-29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 16 have been amended to recite the limitation "and without cobalt (Co)," in reference to the manganese compound (claim 1) and the nickel compound (claim 16). It is the Examiner's position that this express exclusion of cobalt is not supported by the application as originally filed. For example, the abstract of the disclosure states "(where, Ma is at least one element selected from the group consisting of metal elements other than Mn, and B)" and "(where, Mb is at least one element selected from the group consisting of metal elements other than Ni, and B)." Thus, the originally-filed application did not appear to contemplate or envision that Co should be expressly excluded from the compounds. On the contrary, cobalt was originally disclosed as being a preferred metal for use in the compounds. To obviate the present

rejection, it is suggested that the limitation "and without cobalt (Co)" simply be deleted. The limitation is believed to be redundant, as the species of claims 1 and 16 are recited in a Markush format which already excludes other elements (e.g., Co) from being present.

Claim Rejections - 35 USC § 103

6. Claims 1, 2, 8-12, 14, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/59214 in view of Takeuchi et al (U.S. Patent 6,030,726).

Regarding claim 1, the WO '214 reference is directed to a nonaqueous electrolyte secondary battery (see page 1, lines 1-6). The positive electrode contains a complex oxide of manganese, lithium, and cobalt, and a complex oxide of nickel, lithium, and cobalt (see page 15, lines 23-25). The oxides have the formulas $\text{Li}_x\text{Co}_y\text{Mn}_{2-y}\text{O}_4$ ($0 < y < 0.6$) and $\text{LiNi}_x\text{Co}_{1-x}\text{O}_2$ ($0 < x < 1$), respectively (see page 15, lines 23-25). Regarding claim 2, the manganese oxide may be present in an amount of 20-98% by weight of the total electrode structure, and the nickel oxide may be present in an amount of 1-79% (see page 15, lines 23-25). Regarding claims 8-10, the negative electrode contains a material capable of occluding and releasing lithium (e.g., graphite, coke, or carbon black; see page 15, lines 18-20). Regarding claims 9, 11, and 12, the negative electrode may also contain an alloy of lithium and a Group 4B element such as Sn or Si (see page 15, line 20; page 3, lines 6-19). Regarding claims 14, and 28, the electrolyte contains a salt and a solvent such as ethylene carbonate, propylene carbonate, or diethyl carbonate (see page 16, lines 18-23).

The WO '214 reference does not expressly teach that the positive electrode contains a material of the formula $\text{Li}_x\text{Ma}_y\text{Mn}_{2-y}\text{O}_4$ where Ma is Zn, Al, Sn, Cr, or Mg, but without Co, as recited in claim 1.

Takeuchi et al. is directed to a lithium secondary battery. In column 7, lines 15-28, the reference teaches a positive active material comprising $\text{Li}_x\text{Mn}_{2-y}\text{M}_y\text{O}_{4-z}$ where M can be Al, Sn, Cr, Mg, or Co.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the Al, Sn, Cr, or Mg-containing $\text{Li}_x\text{Mn}_{2-y}\text{M}_y\text{O}_{4-z}$ compound of Takeuchi et al. as the $\text{Li}_x\text{Co}_y\text{Mn}_{2-y}\text{O}_4$ compound of WO '214. In column 7, line 15, Takeuchi et al. teach that "[a]s an active material for the positive electrode, a cheap Mn compound having a stable crystalline structure is used." Accordingly, this would provide motivation to use the $\text{Li}_x\text{Mn}_{2-y}\text{M}_y\text{O}_{4-z}$ compound of Takeuchi et al. as the $\text{Li}_x\text{Co}_y\text{Mn}_{2-y}\text{O}_4$ compound of WO '214. Furthermore, the disclosure of Takeuchi et al. also shows that Al, Sn, Cr, and Mg are equivalent to Co when used in the $\text{Li}_x\text{Mn}_{2-y}\text{M}_y\text{O}_{4-z}$ compound. Such substitution of equivalents has been held to be obvious. See *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

7. Claims 7, 13, 15, 27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/59214 in view of Takeuchi et al. as applied to claims 1, 2, 8-12, 14, and 28 above, and further in view of Fujimoto et al (U.S. Patent 5,683,834)

The WO '214 reference does not expressly teach not teach that the cell is spirally wound through a microporous separator and that the electrode layers are coated on both sides of their respective current collectors (claims 7, 13, and 27), or that the electrolyte is solid or gelled (claims 15 and 29).

The patent of Fujimoto et al. is directed to a spirally-wound nonaqueous cell. The separator/electrolyte element may be comprised of a microporous separator, a gelling polymer containing the electrolytic solution, or an inorganic solid electrolyte (see col. 14, line 42 et seq.). Both sides of each current collector are coated with the respective active material (see abstract).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to incorporate the double-sided, spirally-wound electrode configuration of Fujimoto et al. into the battery of WO '214. In the abstract, Fujimoto et al. teach that "the battery is excellent in charge and discharge cycle characteristics, and the sheet electrodes have excellent winding properties when rolled up into cylinders." Accordingly, the artisan would be motivated the double-sided, spirally-wound electrode configuration of Fujimoto et al. into the battery of WO '214.

Additionally, the artisan would be motivated to incorporate any of the electrolyte/separator configurations of Fujimoto et al. into the battery of WO '214. Fujimoto et al. describe

these configurations as “suitable” for use in the battery. Accordingly, the artisan would be motivated to use one of these configurations in the battery of WO ‘214.

8. Claims 16, 20, and 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/59214 in view of Yamashita et al (U.S. Patent 6,255,020).

Regarding claim 16, the WO ‘214 reference is directed to a nonaqueous electrolyte secondary battery (see page 1, lines 1-6). The positive electrode contains a complex oxide of manganese, lithium, and cobalt, and a complex oxide of nickel, lithium, and cobalt (see page 15, lines 23-25). The oxides have the formulas $\text{Li}_x\text{Co}_y\text{Mn}_{2-y}\text{O}_4$ ($0 < y < 0.6$) and $\text{LiNi}_x\text{Co}_{1-x}\text{O}_2$ ($0 < x < 1$), respectively (see page 15, lines 23-25). Regarding claim 20, the manganese oxide may be present in an amount of 20-98% by weight of the total electrode structure, and the nickel oxide may be present in an amount of 1-79% (see page 15, lines 23-25). Regarding claims 22-24, the negative electrode contains a material capable of occluding and releasing lithium (e.g., graphite, coke, or carbon black; see page 15, lines 18-20). Regarding claims 23, 25, and 26, the negative electrode may also contain an alloy of lithium and a Group 4B element such as Sn or Si (see page 15, line 20; page 3, lines 6-19).

The WO ‘214 reference does not expressly teach that the positive electrode contains a material of the formula $\text{LiNi}_{1-z}\text{Ma}_z\text{O}_2$ where Ma is Fe, Zn, Al, Sn, Cr, or Mg, but without Co, as recited in claim 16.

Yamashita et al. is directed to a lithium secondary battery. In column 8, lines 47-53, the reference teaches a positive active material comprising $\text{LiNi}_{1-x}\text{A}_x\text{O}_2$ where A can be Fe, Al, Cr, Mg, or Co.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Yamahira et al. indicates that Fe, Al, Cr, and Mg are equivalent to Co when used in an $\text{LiNi}_{1-x}\text{A}_x\text{O}_2$ compound of a positive electrode. Therefore, it would be obvious to substitute the Fe, Al, Cr, or Mg-containing compound of Yamahira et al. for the Co-containing compound of WO '214. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

9. Claims 18, 19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/59214 in view of Yamashita et al. as applied to claims 16, 20, and 22-26 above, and further in view of Fujimoto et al.

The WO '214 reference does not expressly teach that the mean particle size of the positive active material is 30 microns or below, as recited in claims 18 and 19. The reference further does not teach that the electrode layers are coated on both sides of their respective current collectors (claim 21).

The patent of Fujimoto et al. is directed to a spirally-wound nonaqueous cell. Both sides of each current collector are coated with the respective active material (see abstract). The positive electrode active material (e.g., a nickel or manganese lithium oxide) preferably has an average particle size of from 0.1 to 50 microns (see col. 11, lines 52-55 and col. 12, lines 15-17).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to incorporate the double-sided, spirally-wound electrode configuration of Fujimoto et al. into the battery of WO '214. In the abstract, Fujimoto et al. teach that "the battery is excellent in charge and discharge cycle characteristics, and the sheet electrodes have excellent winding properties when rolled up into cylinders." Accordingly, the artisan would be motivated the double-sided, spirally-wound electrode configuration of Fujimoto et al. into the battery of WO '214.

Additionally, regarding the mean particle size range of 30 microns and below recited in claim 1, Fujimoto's disclosure of 0.1-50 microns is considered to render this limitation obvious. The disclosure of Fujimoto et al. sufficiently guides the artisan to use a particle size of 30 microns or less. Furthermore, it is known that a smaller particle size results in increased electrochemical activity. It has been held that the discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Conclusion

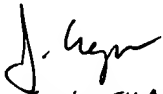
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (703) 308-4333. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 872-9310 (for non-final communications) or (703) 872-9311 (for after-final communications).

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JSC

September 17, 2003


JONATHAN CREPEAU
PATENT EXAMINER
ART UNIT 1746